

CLAIMS

What is claimed is:

1. A corner-pumping method for slab laser comprising:
directing a pump light into a laser slab through slab corners of said laser slab;
propagating the pump light within the laser slab by total internal reflection (TIR); and
substantially absorbing the pump light during propagating.
2. The method as recited in claim 1, wherein corner faces of said laser slab are coated for high transmission for the wavelength of the pump light, and lateral faces of said slab are coated for high reflection for the wavelength of the pump light.
3. The method as recited in claim 1, wherein a laser light propagates inside the laser slab between two TIR faces in a zigzag optical path.
4. The method as recited in claim 1, wherein the step of absorbing has a high absorption efficiency.
5. The method as recited in claim 1, wherein the step of absorbing includes multiple absorptions.
6. A solid-state laser gain module comprising:
a laser slab formed by a solid state laser material, said laser slab including an input receiving an input beam, an output outputting an output beam and slab corners with corner faces; and

a pump source providing a pump light;

wherein said pump light is directed into said laser slab through said slab corners of said laser slab, propagated within said laser slab by total internal reflection (TIR), and substantially absorbed during propagation; and

wherein said laser slab outputs an amplified laser beam.

7. The laser gain module as recited in claim 6, wherein the number of said corner faces is four.

8. The laser gain module as recited in claim 6, wherein said laser slab includes a circumambient portion and a central portion, said circumambient portion including an un-doped host area, said center portion including one or more doped host areas.

9. The laser gain module as recited in claim 8, wherein a cross section of said central portion is rectangular, square or circular.

10. The laser gain module as recited in claim 6, wherein said corner faces of said laser slab are coated for high transmission for the wavelength of the pump light, and lateral faces of said slab are coated for high reflection for the wavelength of the pump light.

11. The laser gain module as recited in claim 6, wherein the input beam and the output beam are located at one same side of said laser slab, said input beam and said output beam forming an angle with each other.

12. The laser gain module as recited in claim 11, wherein two mirrors are placed at another side of the said laser slab symmetrically with respect of said input beam and said output beam.

13. The laser gain module as recited in claim 6, wherein said pump source includes a diode array and a coupling system, said coupling system including two cylindrical lenses and a lens duct, said two cylindrical lenses being placed between the diode array and the lens duct, generatrices of said two cylindrical lenses are orthogonal to each other and are parallel to fast axis and slow axis of said diode array, respectively.

14. The laser gain module as recited in claim 6, wherein said pump source includes a diode array and a coupling system, said coupling system being a fiber bundle.

15. A laser system comprising:

- a pump source for directing a pump light into a laser slab through slab corners of said laser slab;

- means for propagating the pump light within the laser slab by total internal reflection (TIR); and

- means for substantially absorbing the pump light during propagating.

16. The system as recited in claim 15, wherein corner faces of said laser slab are coated for high transmission for the wavelength of the pump light, and lateral faces of said slab are coated for high reflection for the wavelength of the pump light.

17. The system as recited in claim 15, wherein a laser light propagates inside the laser slab between two TIR faces in a zigzag optical path.

18. The system as recited in claim 15, wherein the means for absorbing has a high absorption efficiency.